

Motorola

HOME RADIO

MODEL
63X21
CHASSIS
HS-385

S E R V I C E M A N U A L

GENERAL INFORMATION

TYPE - AC-DC table model, standard broadcast and short-wave receiver.

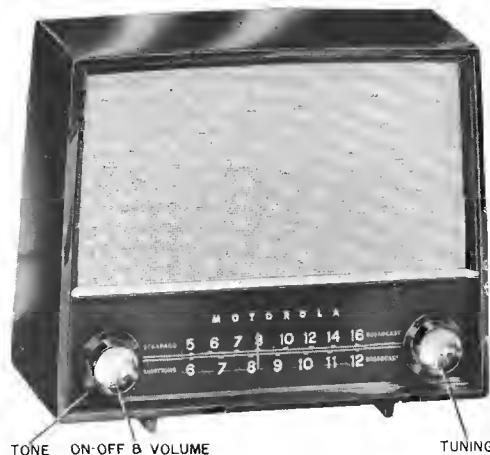
RECEIVER MODEL - 63X21 Ebony

TUBE COMPLEMENT - Type	Function
12BA6	RF Amplifier
12BE6	Converter
12BA6	IF Amplifier
12AT6	Det, AVC & AF Amp
35C5	Power Amplifier
35W4	Rectifier

TUNING RANGE - Standard broadcast 535 to 1620 Kc
Shortwave 6 to 16 Mc

RADIO IF FREQUENCY - 455 Kc

POWER SUPPLY - 117V AC or DC, 30 watts



OPERATING INSTRUCTIONS

ON-OFF-VOLUME. The volume control and power switch are combined and are operated with the volume knob. Turn radio on by rotating the volume knob clockwise until a "click" is heard. Turning the volume knob farther in a clockwise direction will increase the volume.

TONE. The bass or treble response can be varied with the tone control.

TUNING. Tune carefully until you are exactly on the station; tuning to either side of it will result in noisy reception and poor tone quality. Do not regulate volume by detuning the station; always tune exactly on the station, then adjust volume control as desired. Care should be exercised when tuning in short-wave stations. A wider band of frequencies is covered by each turn of the tuning knob, therefore the possibility of passing over the desired station exists when tuning too fast.

BANDSWITCH. Standard broadcast or short-wave reception, as desired, is selected with the knob on the back of the receiver (see Figure 1). Rotate the knob clockwise for standard broadcast or counterclockwise for short-wave reception.

ANTENNAS. No outside antenna is normally required for standard broadcast station reception, as a loop antenna is built into this receiver. Because of the slightly directional characteristics of the loop antenna, reception from some stations may be improved by rotating the receiver. In

noisy locations, rotate the set until minimum noise and maximum signal pick-up are obtained.

For short-wave reception, it is necessary to connect a length of wire (at least 25 feet long) to the screw terminal located on the radio rear panel, as shown in Figure 1. A commercial short-wave antenna will give best results.

The short-wave antenna may be used to increase the set performance on broadcast band operation, if required. Leave the wire connected to the short-wave terminal screw and wind two turns of the wire in the slots at the top of the radio rear panel. See Figure 2.

CAUTION: Never connect antenna or chassis to a water pipe, radiator, or other ground.

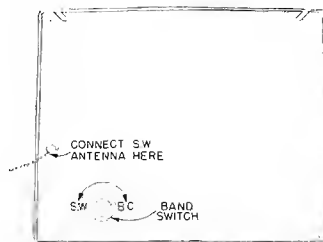


FIGURE 1

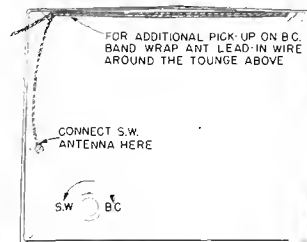


FIGURE 2

LIST APPLICABLE BULLETINS & SUPPLEMENTS HERE:

SERVICE NOTES

The chassis of this receiver is isolated from the AC power line circuit by a capacitor to eliminate the shock hazard when handling the receiver. However, as an additional precaution when aligning or servicing the receiver from AC, an isolation transformer should be inserted between the power line and the chassis.

TO REMOVE THE CHASSIS FROM THE CABINET

1. Pull off the two control knobs.
2. Remove four screws which hold the rear cover to the

cabinet. Disconnect the loop leads.

3. Disconnect the speaker leads.

4. From the back of the cabinet, remove the two hex head chassis mounting screws.

5. Remove chassis mounting screw from bottom of cabinet.

6. Slide the radio chassis from the cabinet.

ALIGNMENT

NOTE: If AC power is used, it is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to B- through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.
2. Connect the low side of the signal generator to B-.
3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.

5. Use a small fibre screwdriver for aligning the IF transformers.

6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than 1.25 volts (.5 watt) across the voice coil to avoid overloading the receiver.

7. See Figure 3 for adjustment locations and the following chart for procedure. NOTE: The BC band must be aligned before SW. If the BC trimmers are adjusted, the SW must also be realigned.

ALIGNMENT CHART

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv. (pin 7, 12BE6)	455 Kc	Fully opened	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
2.	.1 mf	Grid RF amp. (pin 1, 12BA6)	455 Kc	Fully opened	5 (Wavetrap)	Adjust for minimum.
BC RF ALIGNMENT						
3.	.1 mf	Grid of RF amp. (pin 1, 12BA6)	1620 Kc	Fully opened	6 (BC Osc trim)	Adjust for maximum.
4.	-	Radiation loop*	1400 Kc	Tune for max.	8 (BC RF trim)	Adjust for maximum.
NOTE: Steps 5, 6 & 7 need not be performed unless receiver is off calibration or mistracks badly at low frequencies.						
5.	-	Radiation loop*	600 Kc	Tune for max.	7 (BC Osc core)	Simultaneously tune gang and adjust core for maximum signal.
6.	-	Radiation loop*	1620 Kc	Fully opened	6 (Osc trim)	Readjust for maximum, if necessary.
7.	-	Radiation loop*	1400 Kc	Tune for max.	8 (BC RF trim)	Readjust for maximum, if necessary.
SW RF ALIGNMENT						
8.	400 ohms	SW Ant Term.	16.1 mc	Fully opened	9 (SW Osc trim)	Adjust for maximum
9.	400 ohms	SW Ant Term.	15 mc	Tune for max.	10 (SW Ant trim)	Simultaneously tune gang and adjust trimmer for maximum. (Check image frequency which should fall at 15.91 mc.)

*Connect generator output across 5" diameter, 5 turn loop and couple inductively to receiver loop. Keep loops at least 12" apart.

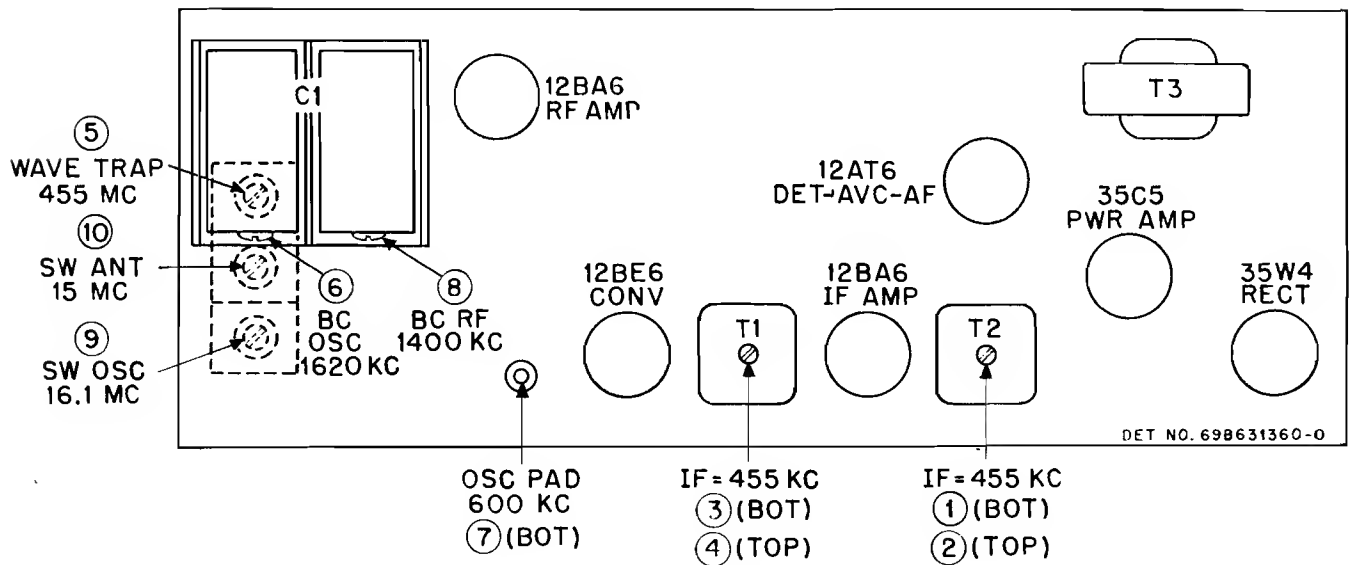


FIGURE 3. TUBE AND TRIMMER LOCATIONS

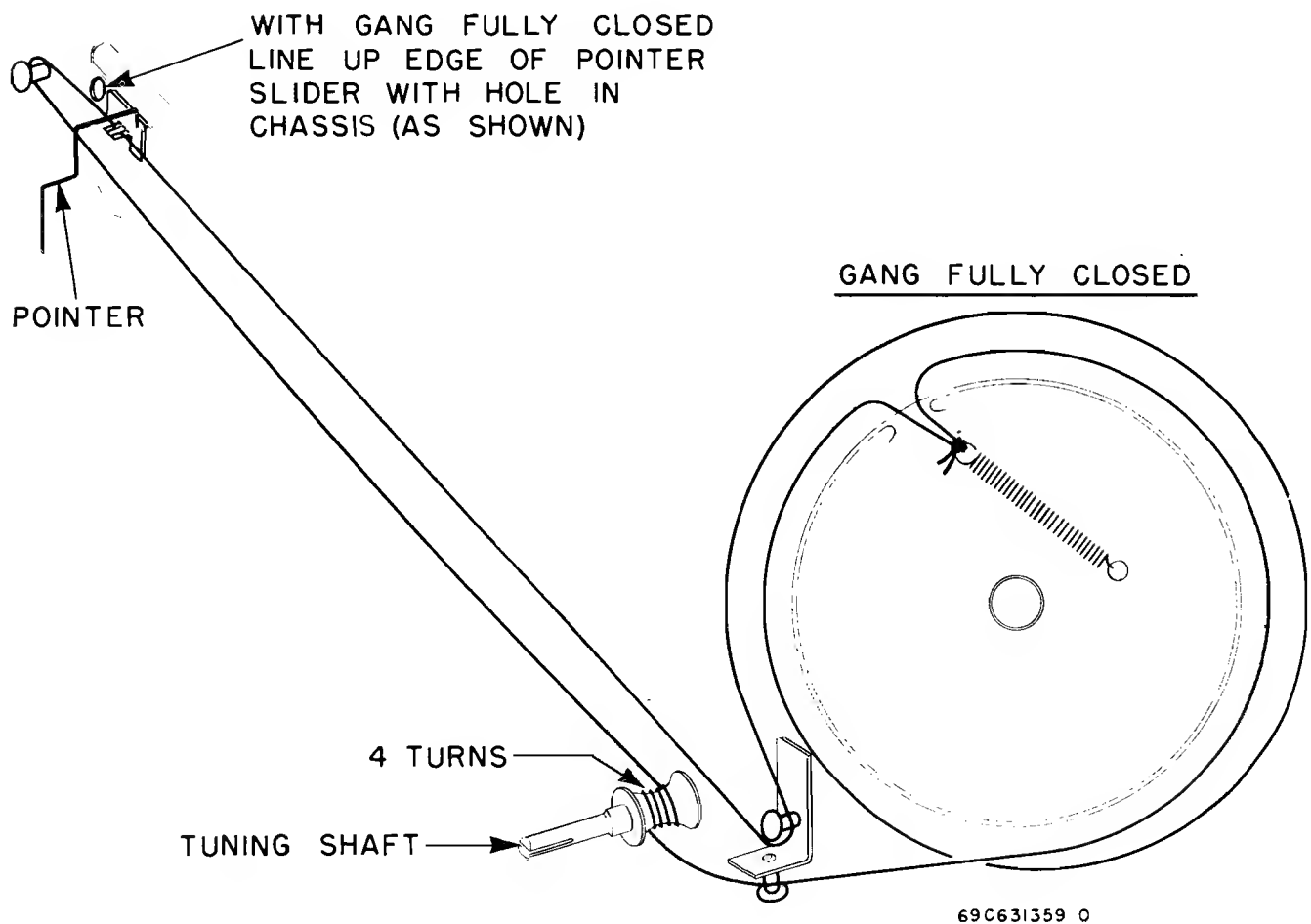


FIGURE 4. DIAL RESTRINGING DETAIL

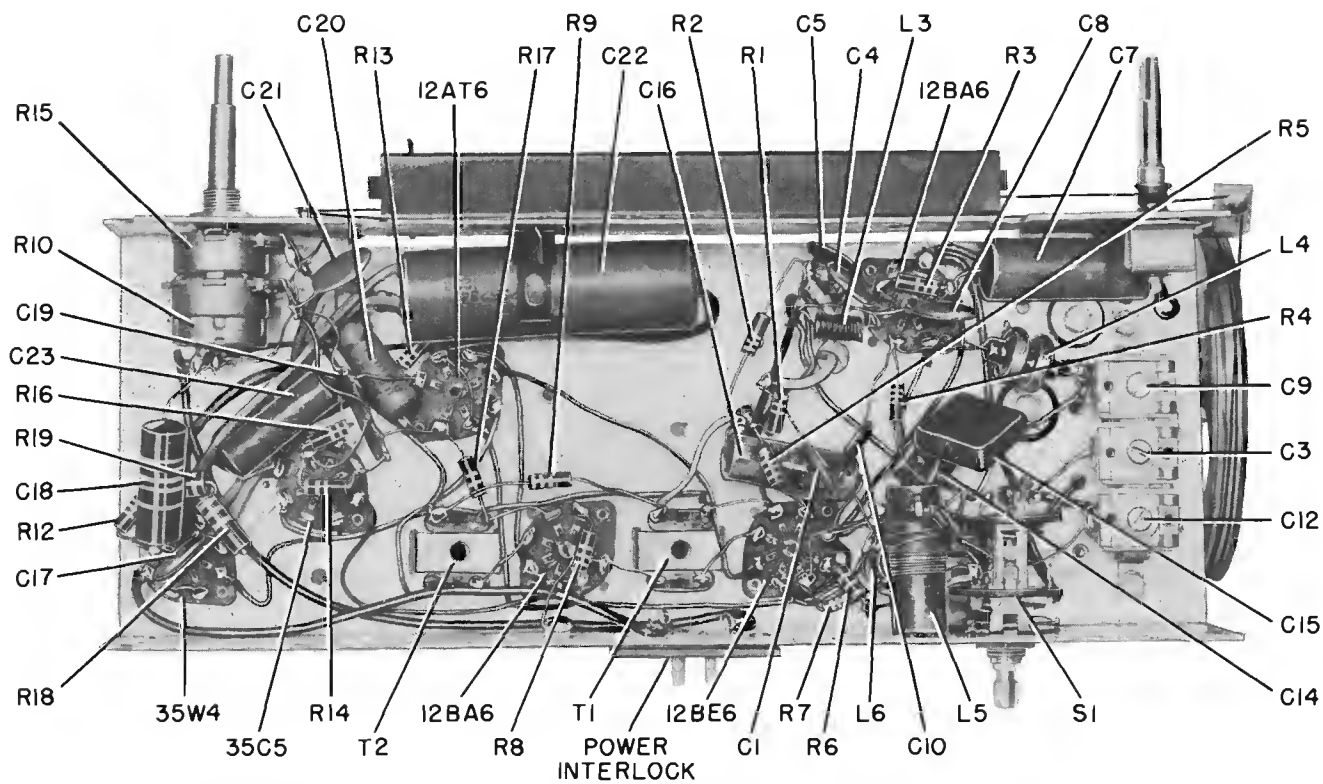
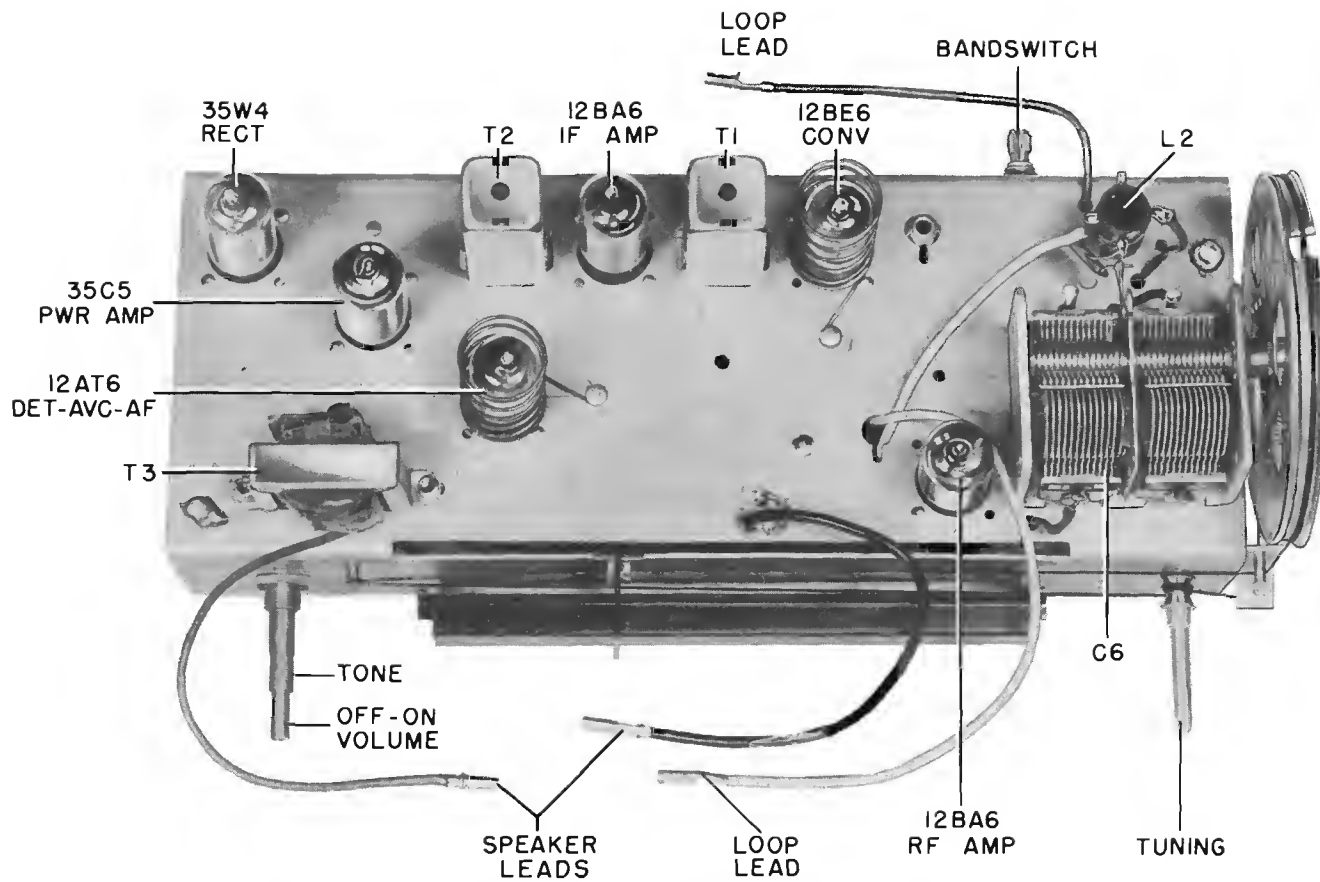


FIGURE 5. PARTS LOCATION

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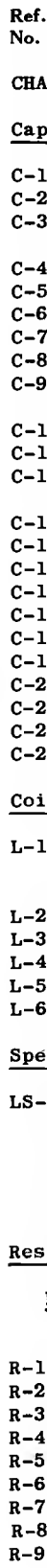
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REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number of set in addition to part number and description of part.

Ref. No.	Part Number	Description	List Price
CHASSIS PARTS - ELECTRICAL			
<u>Capacitors</u>			
C-1	21R482726	Ceramic disc:10,000 mmf 450V	.30
C-2	21R482726	Ceramic disc:10,000 mmf 450V	.30
C-3	20B630626	Variable mica: includes C-9 & C-12 on same brkt.....	.95
C-4	21R482726	Ceramic disc:10,000 mmf 450V	.30
C-5	21R482726	Ceramic disc:10,000 mmf 450V	.30
C-6	19C630628	Variable, 2-gang:with pulley	3.35
C-7	8K72686	Paper: .15 mf 200V.....	.25
C-8	21R482726	Ceramic disc:10,000 mmf 450V	.30
C-9	20B630626	Variable mica: includes C-3 & C-12 on same brkt.....	.95
C-10	21R119912	Ceramic disc: 33 mmf 450V..	.20
C-11	21R114207	Ceramic disc: 47 mmf 750V..	.25
C-12	20B630626	Variable mica: includes C-3 & C-9 on same brkt.....	.95
C-13	21R120551	Ceramic tubular: 18 mmf 500V	.20
C-14	21K120926	Mica, molded: 400 mmf 500V.	.40
C-15	21K120927	Mica, molded: 4700 mmf 500V.	1.70
C-16	8R9821	Paper: .05 mf 200V.....	.25
C-17	21R482726	Ceramic disc:10,000 mmf 450V	.30
C-18	8K490232	Paper,molded:47,000 mmf 400V	.30
C-19	21B482847	Multiple capacitor plate....	.65
C-20	8R9813	Paper: .005 mf 600V.....	.20
C-21	21R482726	Ceramic disc:10,000 mmf 450V	.30
C-22	23B484234	Electrolytic:40-20-20 mf/150V	1.95
C-23	8R9802	paper: .02 mf 400V.....	.20
<u>Coils</u>			
L-1	1V630763	Antenna Loop and Panel Assembly: includes line cord.....	2.80
L-2	24B630625	Short Wave Antenna coil....	.90
L-3	24K630897	Choke, RF.....	.15
L-4	24A630665	Wavetrap.....	.55
L-5	24B630624	Short Wave oscillator coil..	.85
L-6	24B630623	Broadcast oscillator coil...	.95
<u>Speaker</u>			
LS-1	50D630646	Speaker: 6" x 9" PM; 3.2 ohm VC.....	7.75*
		exch	5.80
<u>Resistors</u>			
R-1	6R6075	100,000 20% 1/2W.....doz	1.20
R-2	6R6075	100,000 20% 1/2W.....doz	1.20
R-3	6R3933	220 20% 1/2W.....doz	1.20
R-4	6R6039	4700 20% 1/2W.....doz	1.20
R-5	6R6397	22,000 10% 1/2W.....doz	1.20
R-6	6R6326	100 10% 1/2W.....doz	1.20
R-7	6R6028	22,000 20% 1/2W.....doz	1.20
R-8	6R3992	150 20% 1/2W.....doz	1.20
R-9	6R6004	1 meg 20% 1/2W.....doz	1.20

Note: All resistors are insulated carbon type unless otherwise specified.

R-10,	15	18B630601	Volume & Tone Control: dual; vol 1 meg tapped 300K;tone 1 meg.....	2.10
R-11	6R6012	33,000	20% 1/2W.....doz	1.20
R-12	6R5683	27	10% 1/2W.....doz	1.20
R-13	6R2109	10 meg	20% 1/2W.....doz	1.20
R-14	6R6032	470,000	20% 1/2W.....doz	1.20
R-16	6R3992	150	20% 1/2W.....doz	1.20
R-17	6R6032	470,000	20% 1/2W.....doz	1.20
R-18	6R3953	1000	20% 1W.....	.20
R-19	6R488025	100	20% 1W.....	.20

Transformers

T-1,2	24C485553	IF Transformer: 455 Kc; complete.....	1.45
T-3	25C630619	Output Transformer.....	1.70

Switch

S-1	40C630627	Switch, band.....	1.50
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Part Number	Description	List Price
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CHASSIS PARTS - MECHANICAL

7B630603	Bracket, dial scale background....	.65
7A630611	Bracket, string drive support....	.05
7A600476	Bracket, tuning shaft.....	.10
42A75825	Clip, electrolytic mtg.....	.05
42B485548	Clip, IF trans mtg.....	.35
5A19658	Eyelet, spacer (gang mtg).....doz	.25
5A70404	Grommet, gang mtg: rubber.....	.05
29A620057	Lug, terminal (loop leads)....doz	.25
2S7051	Nut, hex palnut: 3/8-32 x 9/16(vol cont mtg).....doz	.15
28K712319	plug, line cord (interlock).....	.15
52K630609	Pointer & Slider Assem.....	.30
5K71246	Rivet, shoulder (string drive guide).....doz	.15
1V630689	Shaft, tuning: with pulley.....	.05
26A481521	Shield, spring (for 12BA6, 12AT6).....doz	.50
9R119819	Socket, tube: miniature; 7-prong; with dummy lug & center shield...	.15
41A14244	Spring, tension (gang drive cord).....doz	.55
4K692188	Washer, "C" (tuning shaft retaining).....doz	.20

CABINET PARTS

16E630166	Cabinet, table model: plastic; ebony; less speaker grille & dial scale (63X21).....	4.85
30K610638	Cord, line: with plug & receptacle	.95
13C630677	Grille, speaker: silver (63X21)...	2.80
36B630634	Knob, tuning: ebony (63X21).....	.65
36B630637	Knob, volume: ebony (63X21).....	.55
36B630640	Knob, tone: ebony (63X21).....	.30
36K630651	Knob, bandswitch.....	.15
34K630668	Scale, dial.....	1.65
13B630643	Trim, decorative: silver (63X21)...	1.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

*Plus Federal Excise Tax At Current Rate